

What is Claimed is:

1 1. A method for configuring a router to run the OSPF protocol when said router
2 is added to a network of existing routers running OSPF, comprising the steps of
3 analyzing said router to determine if it is not an area border router (ABR) or if it is
4 already connected to a network backbone,
5 if said router or its neighboring router is an ABR and is not already connected to said
6 network backbone, then attempting to establish a virtual link through said router to said
7 network backbone, and
8 if a virtual link cannot be established through said router, establishing a virtual link
9 through a neighbor of said router to said network backbone.

1 2. The process of claim 1 wherein, if complete configuration is desired,
2 performing the previously described process so that virtual links are established from both
3 said router and its neighboring ABR.

1 3. A method for automatically detecting and configuring virtual links in an
2 OSPF router, comprising the steps of
3 analyzing a router to be added to an OSPF network to determine if it requires a link to
4 a network backbone,
5 attempting to establish a virtual link through said router to said network backbone,
6 and
7 if a virtual link cannot be established through said router, establishing a virtual link
8 through a neighbor of said router to said network backbone.

1 4. A method for reconfiguring OSPF protocol routers in an existing OSPF
2 domain, wherein said routers are grouped into a plurality of areas, said method comprising
3 the steps of
4 (a) analyzing area border routers (ABRs) in each said area, in turn, to determine if each
5 area contains at least one ABR connected to the network backbone,

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6 (b) if at least one ABR in an area is not connected to said backbone, establishing a virtual
7 link between an ABR in said area and said backbone, and

8 (c) if complete configuration is desired, repeating steps (a) and (b) for all ABRs in each
9 of said areas.

1 5/ A system for configuring OSPF protocol routers when a router is being added
2 to a network of existing routers, comprising

3 a network management system (NMS) connected to each of said routers in said
4 network and to said router being added to said network,

5 said NMS being arranged to analyze said router being added to said network to
6 determine if it is not an area border router (ABR) or if it is already connected to a network
7 backbone,

8 if said router being added to said network or its neighboring router is an ABR and is
9 not already connected to said network backbone, said NMS being further arranged to
10 establish a virtual link through said router being added to said network to said network
11 backbone, and, if a virtual link cannot be established through said router being added to said
12 network, to establish a virtual link through a neighbor of said router being added to said
13 network to said network backbone.

1 6. The system of claim 5 wherein, if complete configuration is desired, said
2 NMS is arranged to perform said configuration so that virtual links are established from both
3 said router being added to said network and its neighboring ABR.

1 7. Apparatus for automatically detecting and configuring virtual links in a new
2 OSPF router being added to a network of OSPF routers, comprising a network management
3 system (NMS) connected to said new router and other routers in said network, said NMS
4 arranged to

5 (a) analyze said new router to determine if it requires a link to a network backbone,

6 (b) attempt to establish a virtual link through said new router, said link being
7 extended to said network backbone, and

8 (c) if a virtual link cannot be established through said new router, establish a virtual
9 link through a neighbor of said new router to said network backbone.

1 8. Apparatus for reconfiguring OSPF protocol routers in an existing OSPF
2 domain, wherein said routers are grouped into a plurality of areas, said apparatus comprising

3 (a) means for analyzing area border routers (ABRs) in each said area, in turn, to
4 determine if each area contains at least one ABR connected to the network backbone,

5 (b) means for establishing a virtual link between an ABR in said area and said backbone
6 if at least one ABR in an area is not connected to said backbone, and

7 (c) means for repeating the analysis and establishing virtual links for all ABRs in each of
8 said areas if complete configuration is desired.

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